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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/515,675 02/29/00 KASHIMA

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EXAMINER

MM91/1121

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ART UNIT

PAPER NUMBER

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/515,675

Applicant(s)

Keiji Kashima

Examiner

Tarifur R. Chowdhury

Group Art Unit

2871



☒ Responsive to communication(s) filed on Nov 13, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-12 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-12 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Claim Objections

Claim 6 is objected to because of the following informalities: In line 5, a comma (,) should be added after light source. Further in line 17, a comma (,) should be added after light.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 1 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 6, applicant recites, "the light outputting surface being rougher than the face of the at least one light diffusing sheet,". However, it is not clear whether applicant means the light outputting surface of the diffusing sheet or the light outputting surface of the lightconductor. For examination purposes the examiner has assumed that applicant means the light outputting surface of the diffusing sheet is rougher.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 6, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Tedesco, PN 5,418,631.

The admitted prior art , as described in page 1, line 19 - page 2, line 20 and shown in Figure 18, discloses a liquid crystal display apparatus comprising a conventional back light device.

The back light device comprising:

- a light source 3;
- a lightconductor 4 in a substantially plate form comprising a front face 4b(light outputting surface), a back face and side end face 4A;
- light radiated from the light source 3 is made incident on the end face 4A being outputted as a first diffused light having a directivity from the light outputting surface 4B;
- a diffusing sheet 5 for receiving, on its face, the diffused light outputted from the light outputting surface of the lightconductor 4, and outputting a second diffused light having a directivity from a light outputting surface of the diffusing sheet opposite to the face of the diffusing sheet;
- a prism sheet 6;
- a liquid crystal cell 7; and
- a light reflecting sheet 8 which is arranged on the back face of the lightconductor.

The liquid crystal cell has a structure wherein its front and back faces are sandwiched by polarizing plates 9A and 9B.

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The admitted prior art as described in page 3, lines 15-27, further discloses that when a liquid crystal cell is sandwiched by polarizing plates about 50% of incident light gets absorbed by the polarizers. Therefore, the efficiency for using light is low.

Page 4, lines 1-23 of the admitted prior art, further discloses that by employing a polarized beam splitter to separate non-polarized light from a light source into two linearly polarized light beams wherein one polarized light is outputted directly toward a liquid crystal and the other polarized light is reflected, the efficiency for using light can be improved. Therefore, it would have been obvious to one of ordinary skill in the art to substitute the polarizers for a polarizing beam splitter in Figure 18 of the admitted prior art in order to improve efficiency for using light.

Further, the admitted prior art described in the present application does not explicitly disclose that the light outputting surface of the diffusing sheet is rougher. However, Tedesco discloses in column 1, lines 25-40 that conventionally diffusers are formed by process which produces a roughened surface. Therefore, the limitation such as the diffuser having a rougher surface would have been obvious to one of ordinary skill in the art for being conventional.

Accordingly, claims 1 and 6 would have been obvious.

As to claims 11 and 12, since the modified display of the admitted prior art includes a diffuser having a rougher light outputting surface, the limitation such as the light diffusion effects of the first diffused light caused by the lightconductor is different or lower than the second diffused light caused by the light diffusing sheet, is inherent.

Accordingly, claims 11 and 12 would have been obvious

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Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Tedesco as applied to claims 1, 6, 11 and 12 above and further in view of Yokota, PN 5,748,369.

The admitted prior art does not explicitly disclose that the polarized beam splitting sheet is a laminated body having 3 or more layers wherein the layers having different refractive indexes. However, Yokota evidences in column 1, lines 25-30 and shows that a conventional polarized beam splitter comprises a number of (4 in Figure 2) thin glass plates arranged parallel to one another. Even though Yokota does not explicitly disclose that the refractive indexes of the glass plates are different, for the polarized beam splitter to work the refractive indexes of the glass plates must be different. Inherently, polarized beam splitters separates light beam into P and S polarized light beams wherein one of the light beam is transmitted through the sheet and the other is reflected on the sheet, thereby splitting both of the polarized light beams. Accordingly, claims 2 and 7 would have been obvious.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Tedesco as applied to claims 1, 6, 11 and 12 above in view of Broer et al (hereinafter Broer), PN 5,793,456.

The admitted art fails to disclose that the polarized beam splitting sheet includes a circularly polarized light selecting layer comprising a cholesteric layer and a 1/4 phase differentiation layer. However, Broer discloses in column 1, lines 35-58 that by means of cholesteric polarizers it is possible to very efficiently convert unpolarized light into polarized light.

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Such polarizers comprise an optically active layer of a cholesteric material. If this type of polarizers is irradiated with a beam of unpolarized light the part of the light which is compatible with the (right-handed or left-handed) direction and pitch of the helix is reflected, while the remainder of the light is transmitted. By using this type of polarizer, theoretically 100% of incident unpolarized light can be converted into circularly polarized light. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ a polarized beam splitter having a cholesteric layer in the admitted prior art in order covert about 100% of the unpolarized light into circularly polarized light.

Broer does not explicitly disclose that the cholesteric polarizer further comprises a $1/4$ phase differentiation plate. However, it is well known in the art that a $1/4$ phase differentiation plate converts circularly polarized light into linearly polarized light. Therefore, it would have been obvious to one of ordinary skill in the art to further employ a $1/4$ phase differentiation plate in the cholesteric polarizer of Broer in order to further convert the circularly polarized light into linearly polarized light thus obtaining maximum transmittance.

Accordingly, claims 3 and 8 would have been obvious.

Claims 1, 4, 6, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouderkirk et al (hereinafter Ouderkirk), PCT WO 95/17692 in view of Farrell, PN 5,143,433 and Tedesco.

Ouderkirk discloses in page 4, line 7 - page 5, line 13 and shows in Figure 2, an optical display 11 comprising:

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- a three layer LCD assembly 15 that includes a front polarizer 18, a liquid crystal 20 and a rear polarizer 23;
- a light source 30;
- a light guide 34;
- a diffusely reflective layer 39; and
- a reflective polarizer 12.

Ouderkirk fails to disclose a light diffusing sheet for receiving light outputted from the light outputting surface of the light guide. However, Farrell discloses in column 5, lines 7-11 that as a general rule, a diffuser plate is placed in the path of the backlighting rays before they reach LCD. The diffuser tends to smooth out the light intensity to aid in obtaining even intensity across the entire surface of the LCD. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ a diffuser for receiving light outputted from the light outputting surface of the lightconductor in order to obtain even intensity across the entire surface area of the LCD.

Further, Farrell does not explicitly disclose that the light outputting surface of the diffuser is rougher. However, Tedesco discloses in column 1, lines 25-40 that conventionally diffusers are formed by process which produces a roughened surface. Therefore, the limitation such as the diffuser having a rougher surface would have been obvious to one of ordinary skill in the art for being conventional.

Accordingly, claims 1 and 6 would have been obvious.

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As to claims 4 and 9, Ouderkirk discloses in page 5, line 26 - page 6, line 25 and shows in Figure 4 that the reflective polarizer 12 is made of alternating layers of two different materials. Therefore, it is clear from the Figure 4 that the reflective polarizer 12 which is functionally equivalent to a polarized beam splitter has a planar structure having three or more layers each of which has double refraction. Accordingly, claims 4 and 9 would have been obvious.

As to claims 11 and 12, since the modified display of the admitted prior art includes a diffuser having a rougher light outputting surface, the limitation such as the light diffusion effects of the first diffused light caused by the lightconductor is different or lower than the second diffused light caused by the light diffusing sheet, is inherent.

Accordingly, claims 11 and 12 would have been obvious

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Tedesco as applied to claims 1, 6, 11 and 12 above and in view of Heembrock, PN 5,870,156.

The admitted prior art does not explicitly disclose that the light diffusing sheet has a rougher light outputting surface. However, Heembrock discloses in column 1, lines 21-25 that a diffuser panel may be roughened to improve the uniformity of backlighting. Therefore, it would have been obvious to one of ordinary skill in the art to substitute the diffuser of the prior art with a diffuser having a rough surface in order to improve the uniformity of the backlighting. Accordingly, claims 5 and 10 would have been obvious.

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Note: Even though reference 5,870,156 was not applied in the rejection, applicant's attention is respectfully requested to column 1, lines 21-25 which discloses that the diffuser panel may also have a roughened or frosted surface to improve the uniformity of backlighting.

Response to Arguments

Applicant's arguments with respect to claims 1 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Contact Information

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Tarifur R. Chowdhury
November 19, 2000


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